Solar Prominences in 1907, *observed at the Kodaikánal Observatory.*

By John Evershed.

The year has been one of considerable activity as regards prominences, notwithstanding a noticeable reduction in the mean profile area, which amounts to about 10 per cent. for all classes of prominences.

At the Kodaikánal Observatory 78 prominences of 100″ or upwards have been recorded photographically and visually during 305 days of observation. The photographic records show also that large eruptive prominences have not been infrequent, seven of this class having been recorded; the greatest elevation measured was $6\frac{1}{2}$ minutes of arc in a transient eruption, photographed on March 14 in solar latitude $+52$. A remarkable eruption was also photographed by Fox at the Yerkes Observatory on May 21 in solar latitude -68.

The general activity of the two hemispheres of the Sun compared with the previous year may be inferred from the following figures, deduced from the Kodaikánal results:—

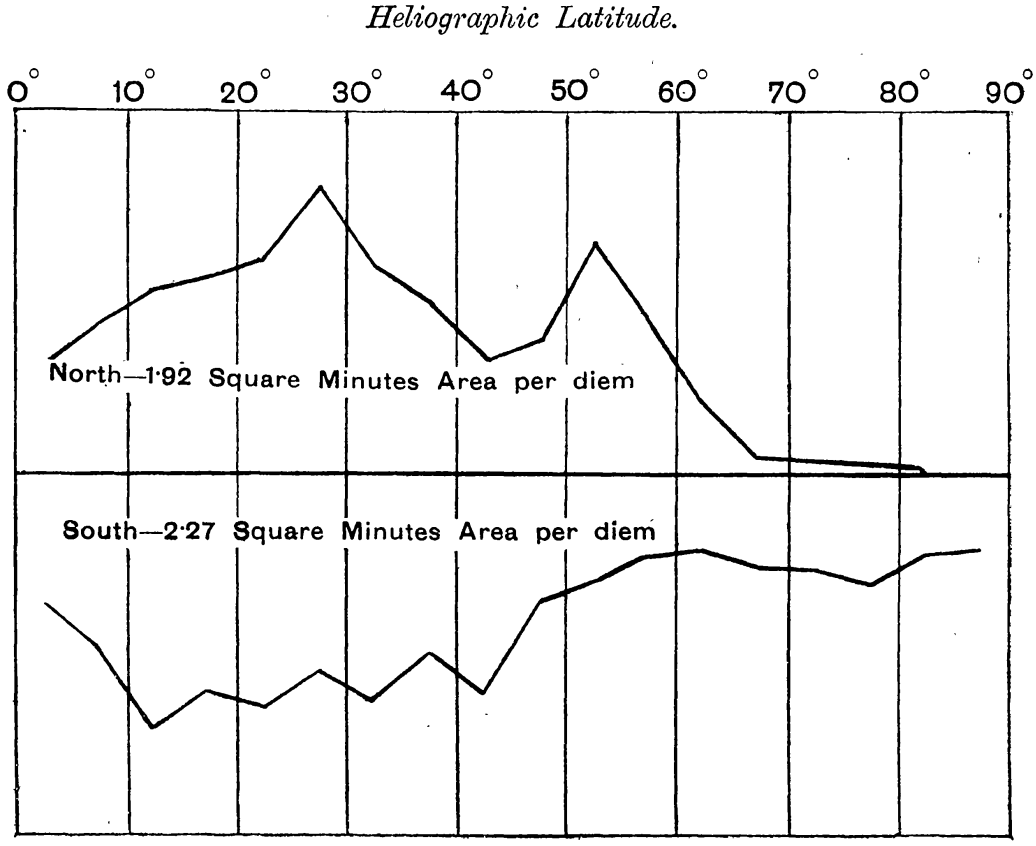
Mean Daily Profile Areas of Prominences.

	1906.	1907.
North	2·51 square minutes.	1·92 square minutes.
South	2·17 „ „	2·27 „ „
Total	4·68 „ „	4·19 „ „

It is seen from the above that the general reduction of activity in 1907 is confined to the northern hemisphere, the southern showing a slight increase. In the latitude distribution a remarkable difference is shown between the two hemispheres, which are usually more or less symmetrical as regards the latitudes of the zones of maxima and minima. From the beginning of the year the northern polar prominences, which were strongly represented during 1906, practically ceased to exist, whilst the south polar region still continued active, the whole region between $-45°$ and the south pole producing a very considerable number of large prominences. The region from lat. $-10°$ to $-45°$ has been the most prolific, however, in this hemisphere; but no clearly marked zones of maxima are shown. In the north, on the other hand, two well-defined maxima occur in the zones $+25°$ to $30°$ and $+50°$ to $55°$.

Metallic prominences were of frequent occurrence, 111 having been recorded. Of these, 54 were confined to the northern spot zone, and had a mean latitude of $+15·7°$; 50 were confined to the southern spot zone, with a mean latitude of $-15·6°$; the remaining 7 were distributed in longitude in a narrow zone entirely outside the spot regions, the mean latitude being $-72°$. The only metallic

elements observed in these high-latitude prominences were Na, Mg, and Fe, whilst some of the prominences in spot-latitudes gave in addition the lines of Ba and Ca, together with a considerable number of unidentified lines, probably including Ni, Mn, Cr, and Ti.



Distribution Curve of the Prominences for 1907.

The ordinates give the mean daily profile areas for each zone of 5°, obtained from observations on 296 days.

The Proper Motion of Small Stars. By S. W. Burnham.

Small stars having any sensible proper motion which can be detected by meridian or micrometric observations, so far placed on record, are much rarer than parallax stars taken from all magnitudes, bright and otherwise. Very few examples have been detected down to this time, although more or less searched for by all double-star observers and others using the micrometer for determining the relative positions of stars. The small stars referred to may be generally classed as below the limiting magnitude of the Durchmusterung, or from the tenth magnitude to the faintest stars which have been accurately measured by large instruments. Of course it is to be expected that this apparent fixity in space would be found in the great majority of instances; or that the motion would be so small that it could not possibly be separated from the unavoidable errors of observation in the most careful measures by all astronomical instruments. Therefore these small stars furnish by far the best means of determining any change in the position of brighter stars when the distance is within reach of the micrometer, and give the proper motion of the large stars more accurately than any number of positions with the meridian circle from the beginning of such observations, provided the interval of time covered by the micrometer measures is sufficient to practically eliminate the smaller errors of that instrument. So, when the prominent stars have been connected by measures with faint stars in the field by the Struves and other old observers, we have a value of the proper motions of the large stars which is a safe and certain correction to that given by meridian positions.

It is hardly necessary to say in this connection that the faint stars referred to have nothing to do with a large and distinct class of these objects which are moving in space with much brighter stars, and at exactly or nearly the same rate, and in substantially parallel directions. We have a large number of these attending stars, some of them of the smallest magnitudes visible in the largest refractors, and in brightness anywhere between that and the naked-eye star. In many instances the moving stars are separated by several minutes of arc. Whether these constitute binary systems in the ordinary sense of the term, or what common proper motion of stars so remote from each other implies, is, at this time, a matter of speculation only, and must necessarily remain so until careful observations have been made, extending over possibly several hundreds of years. That these stars have something in common seems to be at least highly probable. A large number of systems of this class will be found in my *General Catalogue of Double Stars*, indexed in Part I. under "Common Proper Motion," and "Stars of the 61 Cygni type."

One of the very few examples I have been able to find, and